

REMARKS

The applicants thank the Examiner for the thorough examination of the application. It is believed that no new matter is added to the application by this response.

Entry Of Response

Entry of this Response under 37 C.F.R. §1.116 is respectfully requested because it places the application in condition for allowance. Alternately, entry is requested as placing the application in better form for appeal.

Status Of The Claims

Claims 1 and 4-16 are pending in the application.

Rejection(s) Over Funakoshi

Claims 1 and 4-16 are rejected under 35 U.S.C. §103(a) as being obvious over Funakoshi (WO 02/085634) for reasons of record. The Examiner also turns to Liu (U.S. Patent 6,548,149) to support the assertion that the process is conventional. Applicants traverse.

The Present Invention And Its Advantages

The present invention pertains to a novel ink-jet recording material that has good ink absorption while showing few coating defects. Although the present invention has many embodiments, a typical embodiment can be found in claim 1:

1. An ink-jet recording material comprising

a support, and

at least one porous ink-receptive layer containing inorganic fine particles and polyvinyl alcohol provided as a main component of a binder on the support,

wherein the inorganic fine particles are fine particles in which wet process silica is pulverized to have an average secondary particle size of 400 nm or less, and at least one of said ink-receptive layers contains a polymer emulsion containing a polymer compound which shows a hydrophilic property at a temperature region of a predetermined temperature, which is a thermosensitive temperature, or less and shows a hydrophobic property at a temperature region higher than the thermosensitive temperature in an amount of 1 to 25% by weight based on the amount of the polyvinyl alcohol in terms of a solid content.

The ink-jet recording material of the present invention has a porous ink-receptive layer containing inorganic fine particles that are wet process silica prepared by pulverizing to have an average secondary particle size of 400 nm or less. By using these inorganic fine particles in the porous ink-receptive layer, an ink-jet recording material having photo-like high gloss, excellent ink absorption and high productivity can be obtained (see Specification at page 31, lines 1-4).

The "high productivity" of the present invention means improving the handling property of a coating solution by preventing the irreversible gelation that is believed to be caused by the interaction between a thermosensitive latex and inorganic fine particles. This effect is discussed in the specification at page 2, line 20 to page 3, line 6, and at page 11, lines 11-27.

Distinctions Of The Invention Over Funakoshi

Distinctions of the invention over Funakoshi have been placed before the Examiner in the Amendment filed August 5, 2005. For brevity, these distinctions are not repeated in detail here.

Funakoshi pertains to polymer emulsion mixed with silica fine particles that tends to irreversibly gel when coated. Funakoshi was discussed in the specification at page 2, line 20 to page 3, line 6. Funakoshi fails to disclose or suggest using a wet process silica that is pulverized to have an average secondary particle size of 400 nm or less.

At page 2, lines 3-4 of the Office Action, the Examiner asserts that Funakoshi at paragraphs [0084] and [0086] discloses synthetic amorphous silica with a secondary size within the instantly claimed size range. At page 2, lines 7-11 of the Office Action, the Examiner states:

The reference is silent with respect to how the silica size is achieved. One of ordinary skill in the art would have found it obvious to use any well-known technique to achieve that particle size recited by the reference, including pulverization, which is commonly used in the art. In support of the conventional nature of this process in the art, please see Liu et al.

However, these descriptions at paragraphs [0084] and [0086] of Funakoshi are descriptions relating to a core portion (B) of a polymer emulsion mentioned at [0016] and [0075] et seq. of the reference. The pulverized wet process silica set forth in Claim 1 of the present invention is quite different from the core portion (B) mentioned in Funakoshi and instead corresponds to a fine particle (C) described at the paragraph [0104] et seq. of Funakoshi, and the constitution of the present invention and that of Funakoshi are thus fundamentally different from each other.

Also, the Examiner appears to combine Liu with Funakoshi to assert *prima facie* obviousness. However, one of ordinary skill in the art would have no motivation to combine the teachings of Liu with Funakoshi, especially in regards to the core portion (B). This non-combinability arises from paragraphs [0084] and [0086] of Funakoshi describing that colloidal silica, dry process silica, alumina sol and pseudo-boehmite type alumina fine particles are preferable as the core portion (B) at paragraphs [0084] and [0085] of Funakoshi. Therefore, one of ordinary skill would not select the wet process synthetic amorphous silica as the core portion (B), and the pulverized wet process silica disclosed in Liu corresponds to a fine particle (C) disclosed at paragraph [0104] et seq. of Funakoshi, which is quite different from the core portion (B). A person skilled in the art is thus not motivated to utilize the pulverized wet process silica described in Liu as the core portion (B) of Funakoshi.

Moreover, a person of ordinary skill in the art would not employ the pulverized wet process silica described in Liu as the fine particle (C) described at paragraph [0104] et seq. of Funakoshi. In Funakoshi, there is no description about a secondary particle size of the fine particle (C), and at paragraphs [0110], [0111] and [0114] of Funakoshi, there is a description that colloidal silica, dry process silica, alumina sol, pseudo-boehmite type alumina fine particle and specific porous substance are preferable as the fine particle (C). Thus, one of ordinary skill would not select the wet process synthesized amorphous silica as the fine particle (C), and a person skilled in the art is not motivated to select the pulverized wet process silica disclosed in Liu as the fine particle (C).

As a result, one of ordinary skill in art would not be motivated by Funakoshi or Funakoshi in light of Liu to produce a claimed embodiment of the present invention. A *prima facie* case of obviousness has thus not been made.

Further, the present invention displays unexpected results that would fully rebut any obviousness that could be asserted.

In the working Examples of the present specification, when the recording sheet 2 and the recording sheet 3 (which use the pulverized wet process silica) are compared to each other:

Recording sheet 2 which contains no thermosensitive polymer emulsion

(Comparative example): Coating defect rating of "X"

Recording sheet 3 which contains thermosensitive polymer emulsion

(Example of this invention): Coating defect rating of "O"

Thus, by using the thermosensitive polymer emulsion in the recording sheet that uses the pulverized wet process silica, the coating defect rating improves from X to O.

On the other hand, in the recording sheet using fumed silica, i.e., when the recording sheet 6 and the recording sheet 7 are compared to each other:

Recording sheet 6 (which contains no thermosensitive polymer emulsion)

(Comparative example): Coating defect rating of " Δ "

Recording sheet 7 (which contains thermosensitive polymer emulsion)

(Example of this invention): Coating defect rating of "O"

Thus, the improved effect when the fumed silica was used is from a rating of Δ to O. As a result, the unexpected advantages of the present invention over the conventional art of Funakoshi and Liu are clear.

This rejection(s) is overcome and withdrawal thereof is respectfully requested.

Foreign Priority

The Examiner has acknowledged foreign priority and indicated that certified copies of the priority documents have been received in the Office Actions mailed May 5, 2005 and October 14, 2005.

CONCLUSION

The Examiner's rejections have been overcome, obviated or rendered moot. No issues remain. The Examiner is accordingly respectfully requested to place the application in condition for allowance and to issue a Notice of Allowability.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert E. Goozner, Ph.D. (Reg. No. 42,593) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit

Application No. 10/808,454
Amendment dated February 14, 2006
Reply to Office Action of October 14, 2005

Docket No.: 0283-0190PUS1

Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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R. C. S.

Respectfully submitted,

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